

Pressure Governor for Cummins “IS” Engines

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Class 1 provides a variety of engine controls that are used in a broad range of applications, therefore it is impossible for **Class 1** to determine the suitability of a particular control for any specific application. The flexibility of our products allow them to be used in a limitless number of custom applications.

Class 1 can advise you of the features that are available on a given product so that you can determine what product will meet your needs. We believe that the Original Equipment Manufacturer's (OEM) engineering departments should be qualified experts in their product field and are the authorities on product application and safety. Since our products are typically used in safety critical applications, the OEM must undertake appropriate testing to prevent injury to the end user.

WARNING

IT IS THE OEM'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF ANY PRODUCT FOR AN INTENDED APPLICATION, AND TO INSURE THAT IT IS INSTALLED AND GUARDED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, LOCAL AND NFPA SAFETY AND HEALTH REGULATIONS, CODES AND STANDARDS.

Electronic Engine Pressure Governor

The Class1 Pressure Governor is designed to maintain a selected pump pressure or engine speed setting. This unit will work with electronically controlled Cummins Interact System Engines (ISB, ISC & ISM)

Included in the package The governor control is shipped with the following components:

Governor Control	PN 102308
Pressure Transducer	PN 100581/P165-5276-300
User Manual	PN 102947
Installation Harness	PN 102946

Modes of Operation

Power On When the unit is initially powered up, the display will show **[MODE]** and the engine will remain at idle. All switches except the MODE switch are inactive at this point. The mode switch must be pressed to select the desired operating mode (Pressure or Throttle). Then the **INC** (increase), **DEC** (decrease) and **PRESET** switches become active.

Throttle Mode When the unit is in RPM mode, the display will read **"THROTTLE"** and the green RPM LED will be illuminated. Engine speed is controlled by the increase and decrease switches, the display will indicate **"INCREASE"** or **"DECREASE"** as appropriate when these switches are depressed. Initially, the engine speed will ramp slowly and then ramp faster if the switch is held down for more than 3 seconds. The governor will maintain the last speed attained with these switches.

PSI Mode When the unit is operating in PSI mode, **"PRESSURE"** will be displayed and the amber PRESSURE LED will be illuminated. A pump pressure setpoint is taken from the pressure transducer each time a switch is pressed. Using the increase and decrease switches, the display will indicate **"INCREASE"** or **"DECREASE"** as appropriate. The governor maintains pump discharge pressure by controlling engine speed to maintain the pressure setpoint. The governor will maintain the last pressure achieved with the switches. When the governor is actively controlling the engine to maintain pressure, the display will show **"CTRL INC"** or **"CTRL DEC"** to indicate control and direction.

Switching between modes Pressing the mode switch will change the governor from RPM to PRESSURE mode without a significant change in engine speed or pump pressure. The message center will indicate **"PRESSURE"** or **"THROTTLE"** accordingly.

Preset Mode Pressing the **PRESET** switch in either mode will control the engine to attain the preset RPM or pump pressure.

High Idle Mode An input is available to bring the engine speed to the PRESET RPM (High Idle) from a remotely mounted switch. When the governor is operating in this mode, the display will read **"HIGHIDLE"**. This function is unavailable when the governor is operating or if the pump is engaged. Pressing the **IDLE** switch causes the high idle to drop out and the high idle input must be toggled off and then on again to reinstate high idle. The **INC** and **DEC** switches are active with high idle, however they will not change the stored preset RPM.

Idle Mode Pressing the **IDLE** switch at any time will return the engine to idle speed and clear the current session setpoints from the governor.

At governor power on, the Message Center will display

[MODE]

and neither the RPM nor the PRESSURE LED will be illuminated.

At this point, you must select an operating mode using the MODE switch before the governor will operate.

The governor will check for a valid pressure transducer signal at power up, if none is found

SENSOR

will be displayed in the message center.

If no interlocks are established,

NO-INTLK

will be displayed in the message center when the MODE switch is pressed and the governor will not respond to an increase or decrease request.

If only the OEM throttle interlock is active, you may select RPM mode and

THROTTLE

will be displayed. If you attempt to select pressure mode,

NO-INTLK

will be displayed when the MODE switch is pressed and the governor will remain in RPM mode and

THROTTLE

will be displayed. The governor will respond to increase and decrease commands from the INC and DEC switches within the operating capabilities of the engine. When the INC switch is pressed,

INCREASE

is displayed in the message center.

When the DEC switch is pressed,

DECREASE

is displayed.

Every time the INC or DEC switch is released, the current engine RPM is maintained by the governor and the message center will display

THROTTLE

to indicate that the governor is active and operating in RPM mode. Whenever the governor adjusts the engine speed to maintain the established RPM,

CTRL INC or CTRL DEC

will be displayed while the governor is actively adjusting engine speed to maintain the setpoint. The message center will again display

THROTTLE

once the adjustment has been completed.

When the PTO Engaged Interlock is active, pressure mode can be selected and the governor switch operation and display is identical to RPM mode except that

PRESSURE

is displayed instead of THROTTLE and the PRESSURE LED will be illuminated.

Whenever you desire to return to idle, press the IDLE switch. The message center will display

IDLE REQ

and the engine speed will be reduced to normal idle. This clears the governor of any current session PSI or RPM setpoints and

[MODE]

will be displayed in the message center.

The PRESET switch can be used anytime after an operating mode has been selected to promptly bring the engine or pump to the preset point. The message center will display

-PRESET-

while the engine is being adjusted and then either

THROTTLE

or

PRESSURE

will be displayed dependent on the operating mode selected.

While the governor is powered up and the OEM Throttle Interlock is active, a remote High Idle function is available. A 12 volt input is available to activate this feature.

This feature will not activate if a governing mode has been chosen, the pump engaged interlock is active or the throttle interlock is lost. If High Idle is active, it will drop out when the pump is engaged or the throttle interlock is lost. While the high idle feature is active,

HIGHIDLE

will be displayed in the message center. The INC and DEC switches are active in the High Idle Mode, but only change the engine speed from the preset speed for the current session.

When operating in pressure mode, once the pump pressure exceeds 40 PSI, the governor will monitor the pump discharge for water starvation. If the pump discharge pressure drops below 25 PSI for more than 5 seconds, the governor will return the engine to idle.

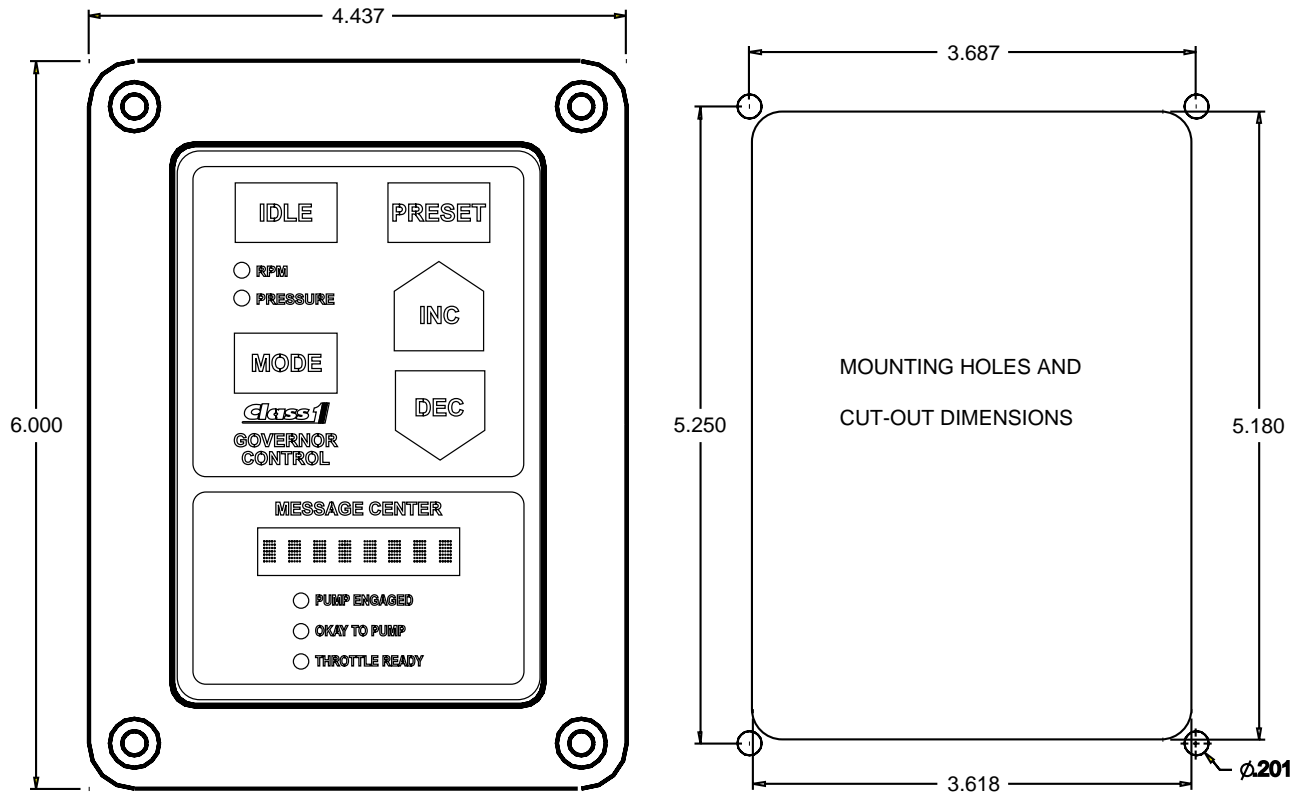
CAVITATE

will be displayed in the message center. The governor enters it's initial power on state and a mode *must be* selected before governing is enabled again.

NOTE: While the governor is determining cavitation, the discharge pressure drop will be treated normally. That is, the engine will be commanded to increase speed to compensate for the pressure reduction. This can result in the engine running at it's maximum PTO speed. If the water loss is not sufficient to keep the pressure below 25 PSI for 5 seconds, the timing loop is reentered and this could result in the engine running at maximum RPM for a period of time longer than 5 seconds. The pump operator should be vigilant to this possibility.

Installation

Control Module The control module requires a rectangular cutout as shown. The module is watertight and may be mounted in any location on the operators panel.



Pressure Transducer

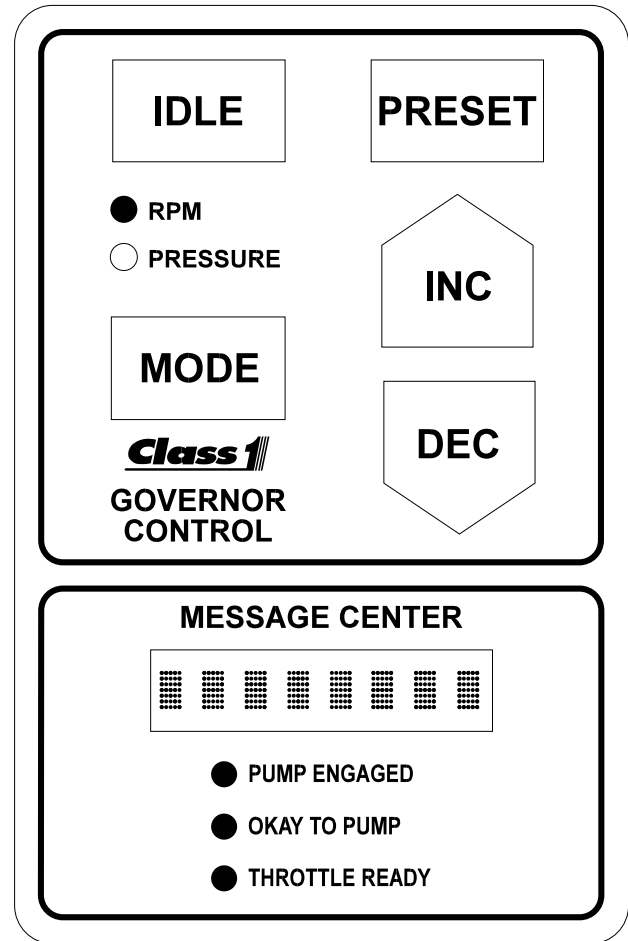
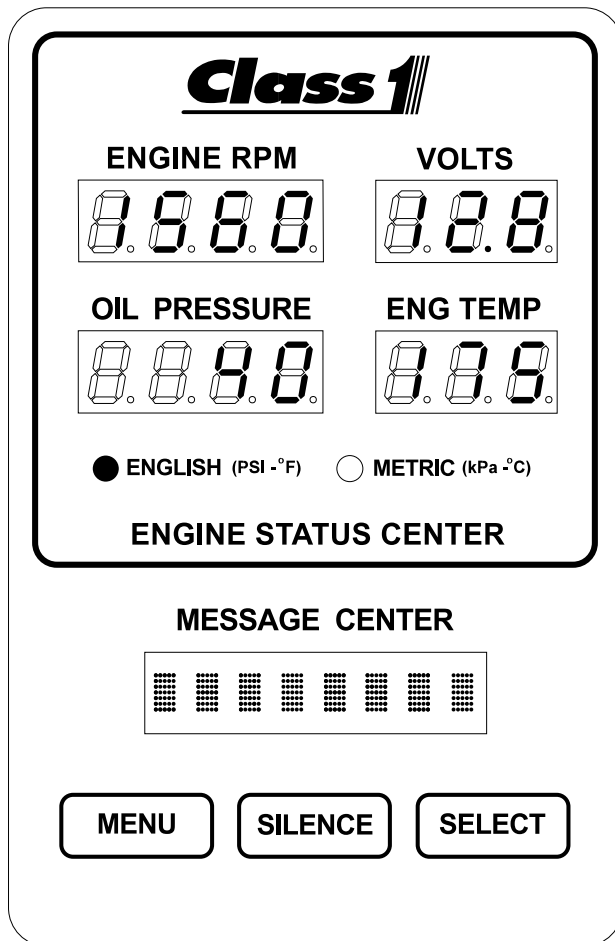
Locate the pressure transducer in the discharge manifold of the pump. Threads are 1/4 NPT and a sealant should be applied prior to installation. The transducer should be located in an area with minimum turbulence. When tightening the transducer, apply torque to the 1-1/4" hex flange of the transducer, not the body.

System Wiring

The pressure governor comes with wiring and connectors to aid installation. Refer to the diagrams in the manual for specific governor requirements. Refer to the appropriate Engine Electronic Application and Installation Guide for information on engine electrical interfacing and programming.

Special Programming Considerations for the engine

The Cummins Electronic Engine Control Module (ECM) must be programmed for the remote Accelerator feature.



The pressure governor can be combined with a **Class 1** Engine Status Center to provide the pump operator with necessary engine information in a matching style display.

Water Loss The control unit will protect against running the pump dry after water loss is detected.

Once the discharge pressure reaches 40 PSI, the governor monitors the pressure transducer for cavitation. If the pressure drops below 25 PSI for 5 seconds and the pressure does not recover, the engine will be controlled to idle and the display will show

CAVITATE

until the mode switch is pressed.

Normal response is for engine RPM to increase in an effort to maintain pump discharge pressure.

Power and Ground

It is imperative that the **Class 1** Pressure Governor be grounded directly to the vehicle battery and that the unit be powered by the same source as the engine Electronic Control Module.

This is the only configuration that will assure reliable operation.

Terminal 4-1 This is the Governor power input 12/24 VDC.

Terminal 4-2 This is the Governor ground input.

Interlocks

There are two (2) 12 VDC interlocks that must be supplied to the governor for operation.

Terminal 12-2

The Throttle Ready or OEM Interlock must be continuously maintained once it is established. This input allows the governor to operate in RPM mode and accept a High Idle input.

Terminal 12-10

The Pump Engaged Interlock is necessary to initiate pressure governing and it must not cause the OEM interlock to dropout when it is established or erratic operation of the governor could ensue. When the pump engaged interlock is active, the high idle function is precluded.

High Idle

Terminal 12-3

This 12 volt signal input causes the governor to bring the engine to a preset RPM.

Remote Accelerator On/Off Relay

Terminals 12-11 and 12-12

ISC There is a delayed (2 second) output available to switch Battery Ground to the remote accelerator switch (ECM-B45).

ISM There is a delayed (2 second) output available to switch Common #1 to the remote throttle enable switch (ECM-B43).

This is the recommended configuration to handle the throttle source switching function from the cab throttle to the remote throttle.

Transducer Connection

Terminals 12-5, 12-6 & 12-7

Sensor ground is provided at terminal 5.

Sensor voltage (5VDC) for the pressure transducer is at terminal 6.

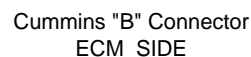
Sensor signal is input at terminal 7.

Control Signal

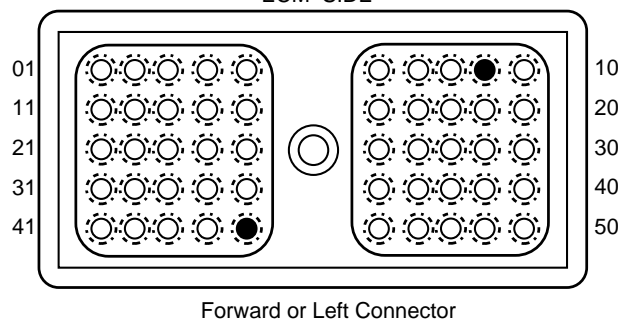
Terminal 12-8

The engine control signal output is sent to the engine ECM remote throttle position input.

Cummins ISC
Governor Controller

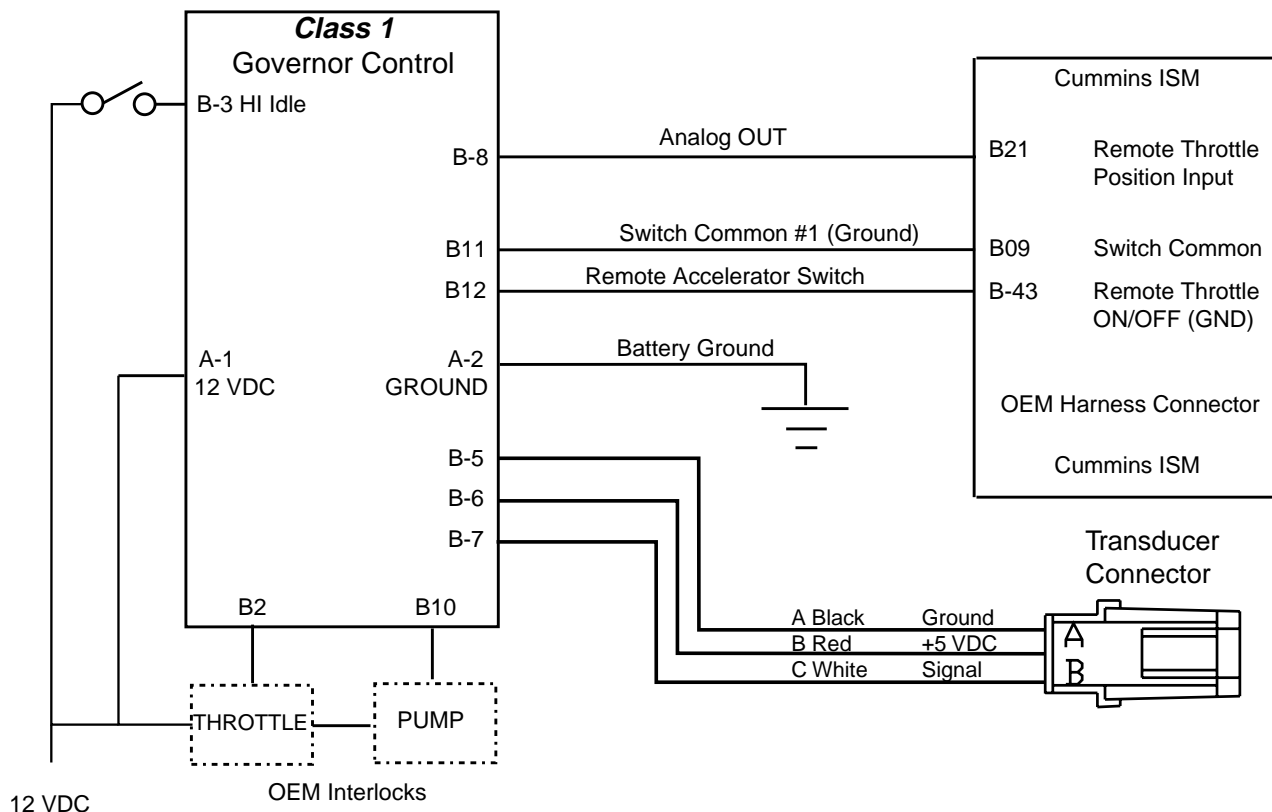


Interlocks should conform to any applicable safety considerations for the vehicle's intended use, such as the latest edition of the N.F.P.A. 1901 Standard for Automotive Fire Apparatus.



Terminal 8
Terminal 11
Terminal 12

The **Class 1** Pressure Governor interfaces with the Cummins Engine Control Module (ISM) through the 50 pin OEM connector.



NOTES:

The Cummins ECM must be programmed for Remote Throttle!
This document is meant only as an installation guide.

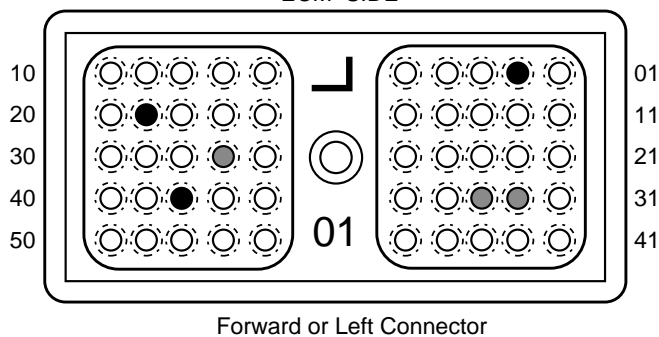
All information is correct as of the date drawn, but the customer needs to be aware that any documentation is subject to change without notice and that the best possible resource is the equipment manufacturer directly.

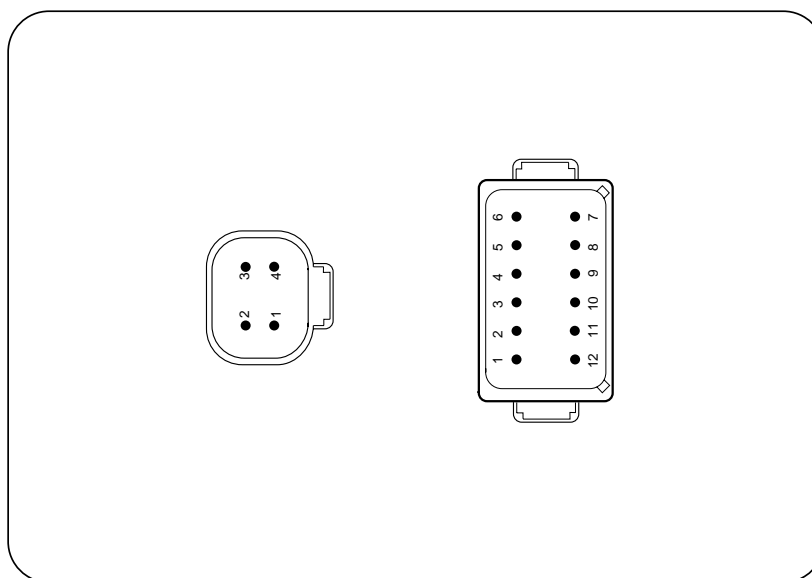
Interlocks should conform to any applicable safety considerations for the vehicle's intended use, such as the latest edition of the N.F.P.A. 1901 Standard for Automotive Fire Apparatus.

OEM Connector

- 09 Switch Common #1 (Ground)
- 21 Remote Throttle Position Signal
- 26 J1708 Data Link (+)
- 27 J1708 Data Link (-)
- 34 Remote PTO Enable Signal (Preset Speed, NOT Throttle)
- 43 Remote Throttle Enable Signal (Throttle)
- 48 Accelerator Position +5 VDC Supply
- 49 Accelerator Position Return (Ground)

Cummins OEM Connector ECM SIDE





DT06-4S

1	System Power	12 VDC	INPUT
2	System Ground	Ground	INPUT
3	Plug	NC	
4	Plug	NC	

DT06-12S

1	Plug	Plug	OUTPUT
2	Throttle Interlock	12VDC	INPUT
3	High Idle	12 VDC	INPUT
4	Plug	NC	
5	Signal Ground	XDucer Ground	OUTPUT
6	Signal Voltage	XDucer 5 VDC	OUTPUT
7	Signal IN	Xducer Signal	INPUT
8	Analog Out	Control Signal	OUTPUT
9	Plug	NC	
10	Pump Engaged Interlock	12 VDC	INPUT
11	Delay Relay Common (30)	Enable Input	INPUT
12	Delay Relay NO (87)	Enable Output	OUTPUT

Governor Connectors

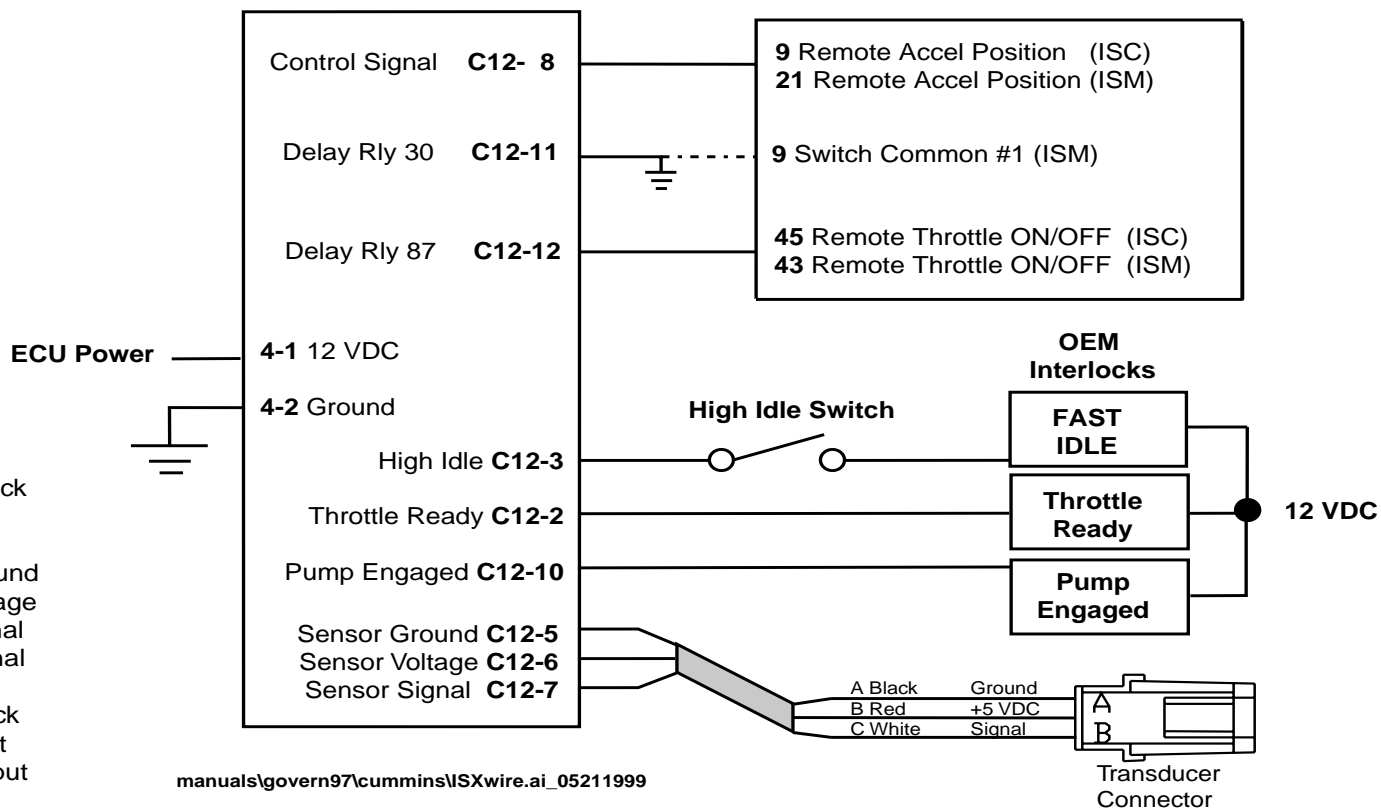
OEM	Circuit	Governor
Terminal 21	Remote Accelerator Position	Terminal 8
Terminal 09	Switch Common #1	Terminal 11
Terminal 43	Remote Accelerator Switch	Terminal 12

Class 1

Pressure Governor

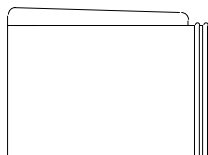
Cummins
ECM

Connector Terminal	DT06-4S Sockets	
Position	Wire Color	Description
1	RED	+ 12 VDC
2	Black	Ground
3	Plug	NC
4	Plug	NC
Connector Terminal	DT06-12S Sockets	
Position	Wire Color	Description
1	Plug	NC
2		OEM Interlock
3		High Idle
4	Plug	NC
5		Sensor Ground
6		Sensor Voltage
7		Sensor Signal
8		Control Signal
9	Plug	NC
10		PTO Interlock
11		Enable Input
12		Enable Output



CONNECTOR: DEUTSCH
DT06-4S

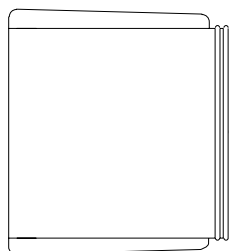
POS	WIRE DESCRIPTION
1	RED (12 VDC)
2	BLACK (GROUND)
3	PLUG
4	PLUG



Power Cable

CONNECTOR: DEUTSCH
DT06-12SA

POS	WIRE DESCRIPTION
1	PLUG
2	OEM INTERLOCK 12V
3	HIGH IDLE 12V
4	PLUG
5	BLACK (TRANSDUCER ground)
6	RED (TRANSDUCER power)
7	WHITE (TRANSDUCER signal)
8	BLACK (ENGINE SIGNAL)
9	PLUG
10	PTO INTERLOCK 12V
11	RED (Ground, chassis or signal)
12	WHITE (REMOTE ACCEL SWITCH)



Transducer Cable

CONN: PACKARD 12065287

POS	WIRE DESCRIPTION
A	SENSOR RETURN (BLK)
B	SENSOR +5 (RED)
C	PSG PUMP PSI (GRN)



Engine Cable

- THROTTLE SIGNAL
- Ground
- REMOTE ACCEL SW

OEM Cable

CIRCUIT	COLOR
OEM INTERLOCK	WHT
HIGH IDLE	WHT
PTO INTERLOCK	WHT

Changing the preset RPM or Pressure

Remove power to the controller.

Press and hold the Preset Switch.

Apply power to the controller and continue to hold the preset switch until the display shows PRESET, then release the preset switch (approx. 5 seconds).

Select a mode and operate the controller until you attain the desired RPM or pressure.

Press the PRESET switch to store this value.

The display will read "STORE" while the value is being stored, change the operating mode and select the desired preset for that mode.

Press the PRESET switch to store this value.

Press IDLE to return to normal operation.

Programmable Parameters

Press and hold the IDLE and PRESET switches then press the MODE switch. The message center will show

-MENU-

press the MODE switch. This will scroll through the three menu options.

SET RAMP

SET SENS

SET GAIN

When the option that you want to change is displayed, press the INC switch to select it.

RPM Ramp Rate: This parameter controls how fast the governor responds to increase and decrease requests. Values are 0-10 with 5 being the default. The lower the value, the faster the response.

Ramp XX

is displayed where XX is the current numeric value. Pressing the INC/DEC switches change the value. Press PRESET to save change. Press MODE to scroll to the next parameter.

PSI Gain: This parameter controls the pressure gain or how quickly the governor controls the engine to react to pressure changes. Values are 0-10 with 5 being the default. The lower the value, the slower the response.

Gain XX

is displayed where XX is the current numeric value. Pressing the INC/DEC switches change the value. Press PRESET to save change. Press MODE to scroll to the next parameter.

PSI Sensitivity: This parameter controls the pressure sensitivity or how much the pressure is allowed to deviate from the setpoint before the governor will control the engine to restore the setpoint pressure. Values are 0-10 with 5 being the default. The lower the value, the tighter the pressure window the governor maintains.

Sense XX

is displayed where XX is the current numeric value. Pressing the INC/DEC switches change the value. Press PRESET to save change. Press MODE to scroll to the next parameter.

Pressing IDLE exits from the Menu and saves the current parameters. The message displayed is:

-DONE-

The control signal is an analog voltage that uses 900 mV for idle and 3.8 V for maximum throttle. If the signal is present and varies with the INC/DEC switches, it is functioning.

A delay relay is incorporated that activates 2 seconds after 12 V is input on terminal 2 of the 12 pin connector. Common (30) at pin 11 and NO (87) at pin 12.

12 V at pin 2 allows throttle operation and 12 V at pins 2 and 10 allows PSI governing.

The transducer must have 5 VDC from the governor (B-6) at terminal B.
The transducer must have ground from the governor (B-5) at terminal A.
The transducer returns a variable voltage signal from terminal C to the governor (B-7).
Check for signal voltage and ground at the transducer with a meter between pins A and B with the transducer unplugged. **It must be +5.0 VDC.** If the voltage and ground are correct, plug the transducer in and check for PSI voltage at the governor (B-7). It must range between 700 mV and 4.5 V and vary with pressure.

	100581 P165-5276 300 PSI
True Pressure	Transducer Voltage Low mV
0-22	680
23-34	988
35-44	1168
45-54	1307
55-64	1427
65-74	1567
75-84	1708
85-94	1846
95-104	1988
105-114	2105
115-124	2243
125-134	2384
135-144	2522
145-154	2664

- 91 PWM
- 92 RAW XDCR
- 93 PSI
- 94 POT CNTS
- 95 PARAMETER
- 96 PRESET